

WHAT IS CLAIMED IS:

1. An impregnation process, comprising the steps of:

5 a.) providing at least one mobile vessel in which impregnation of a porous article can be carried out, said vessel comprising a chamber for containing a flowable impregnating composition and at least one porous article to be impregnated;

b.) providing a series of stations defining an impregnation sequence, each of said stations to perform at least one specific impregnation step on said at least one porous article within said at least one vessel;

10 c.) sequentially directing said at least one vessel to at least one selected station chosen from said series of stations; and

d.) performing said at least one specific impregnation step at said at least one selected station.

15 2. The impregnation process of claim 1, wherein said series of stations includes a vacuum station where a vacuum step is performed on said vessel chamber to remove air from at least one porous article.

20 3. The impregnation process of claim 2, wherein said chamber to returned to ambient pressure to initiate impregnation of said porous article.

4. The impregnation process of claim 3, wherein said series of stations includes a pressure station where a pressurization step is performed on said at least one porous article to complete said impregnation of said porous article.

25 5. The impregnation process of claim 1, further comprising the step of reclaiming said flowable impregnating composition.

30 6. The impregnation process of claim 5, wherein said series of stations includes a flowable impregnating composition retrieval station where said reclaiming step is performed.

7. The impregnation process of claim 6, wherein said reclaiming step includes

tipping said at least one vessel horizontally so as to pour said impregnating composition therefrom.

8. The impregnation process of claim 1, wherein said series of stations includes a centrifuge station where a centrifuge step is performed on said at least one porous article to expel excess flowable impregnating composition from an exterior surface thereof.

9. An impregnation process, comprising the steps of:

a.) providing at least one mobile vessel containing a flowable impregnating

composition and at least one porous article to be impregnated;

b.) providing a series of stations defining an impregnation sequence, each of said stations to perform at least one specific impregnation step on said at least one porous article within said at least one vessel;

c.) sequentially directing said at least one vessel to at least one selected station chosen from said series of stations;

d.) performing said at least one specific impregnation step at said at least one selected station; and

e.) repeating steps c.) and d.) until said at least one porous article is impregnated with said flowable impregnating composition.

10. The impregnation process of claim 9, wherein said flowable impregnating composition transitions from liquid to solid upon infiltrating a porosity of said porous article.

11. The impregnation process of claim 10, wherein said flowable impregnating composition is selected from the group of curing compositions consisting of anaerobic, heat, moisture, radiation and evaporation curing compositions.

12. The impregnation process of claim 9, further comprising the step of de-aerating said flowable impregnating composition prior to providing said flowable impregnating composition to said at least one vessel.

13. The impregnation process of claim 12, wherein said de-aeration step is executed in an independent de-aeration vessel.

14. The system according to claim 13, wherein said de-aeration vessel retains said flowable impregnant composition therein during application of a vacuum thereon to remove air from within said flowable impregnant composition.

15. The impregnation process of claim 9, further comprising the step of reclaiming said flowable impregnation composition.

16. The impregnation process of claim 15, wherein said series of stations includes a flowable impregnating composition retrieval station where said reclaiming step is performed.

17. The impregnating process of claim 16, wherein said reclaiming step includes tipping said at least one vessel horizontally so as to pour said flowable impregnating composition therefrom.

18. A system for impregnating porous articles comprising:

(a) a series of stations defining an impregnated sequence wherein each of said stations performs at least one specific impregnation step for impregnating one or more porous articles;

(b) at least one mobile vessel for retaining a flowable impregnating composition and said one or more porous articles to be impregnated, for transporting said composition and said at least one article to said series of stations and for providing a closed environment for conducting said impregnation steps; and

(c) means for directing said vessel sequentially to said series of stations.

19. The system according to claim 18, wherein said series of stations includes a vacuum station where a vacuum step is performed on said at least one porous article to remove air from porosity thereof.

20. The system according to claim 19, wherein said at least one mobile vessel sustains a vacuum applied thereon.

5 21. The system according to claim 20, wherein said series of stations includes a pressure station where a pressurization step is performed on said at least one porous article to complete said impregnation of said porous article.

10 22. The system according to claim 21, wherein said at least one mobile vessel sustains a pressurization step applied thereon.

23. The system according to claim 19, wherein said series of stations includes a flowable impregnating composition retrieval station for reclaiming said flowable impregnating composition after impregnation of said porous articles.

15 24. The system according to claim 19, wherein said series of stations includes a centrifuge station where a centrifuge step is performed on said at least one porous article to expel excess flowable impregnating composition from an exterior surface thereof.

20 25. The system according to claim 18, wherein said flowable impregnating composition transitions from liquid to solid upon infiltrating a porosity of said porous article.

25 26. The impregnation process of claim 25, wherein said flowable impregnating composition is selected from the group of curing compositions consisting of aerobic, heat, moisture, radiation, and evaporation curing compositions.

27. The system according to claim 18, further comprising means for de-aerating said flowable impregnating composition.

30 28. The system according to claim 27, wherein said de-aerating means includes an independent de-aeration vessel.

29. The system according to claim 28, wherein said de-aeration vessel retains said flowable impregnant composition therein during application of a vacuum thereon to remove dissolved air from within said flowable impregnant composition.

5 30. The system according to claim 18, wherein each of said stations comprises a plurality of processing positions for accommodating multiple vessels simultaneously.

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10 31. The system according to claim 18, wherein said directing means includes a hoist, conveyor, rails, robot, human operator, forklift or other means for transporting said at least one mobile vessel to each of said stations.

15 32. The system according to claim 18, wherein said directing means includes a programmable logic controller, PC based controller or other means of executing machine logic.

20 33. A system for impregnating porous articles, comprising:
a series of stations defining an impregnated sequence wherein each of said stations performs at least one specific impregnation step for impregnating one or more porous articles;
at least one mobile vessel for retaining a flowable impregnating composition and said one or more porous articles to be impregnated, wherein said flowable impregnating composition requires de-aeration prior to use; said vessel being adapted to transport said composition and said at least one porous article to said series of stations; and being adapted to provide a closed environment for conducting said impregnation step;
25 means for directing said vessel sequentially to said series of stations; and
means for de-aerating said flowable impregnating composition.

30 34. The system according to claim 33, wherein said de-aerating means includes a de-aeration vessel independent of a flowable impregnant storage tank and process vessel.

35. The system according to claim 34, wherein said de-aeration vessel retains said flowable impregnant composition therein during application of a vacuum thereon to remove dissolved air from within said flowable impregnant composition.

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36. An impregnation system comprising:
at least one de-aeration vessel for containing a flowable impregnation composition to be de-aerated, said vessel being adapted for applying a negative pressure to said composition to remove air therefrom; and
10 at least one impregnation vessel adapted for carrying out impregnation of a porous article with a flowable impregnation composition
wherein said de-aeration vessel remains independent of a flowable impregnant storage tank and process vessel.

15 37. The system of claim 36, further including transfer means for transferring de-aerated impregnation composition from said de-aeration vessel to said impregnation vessel.

38. The system of claim 36, further including a series of impregnation stations.

20 39. The system of claim 36, wherein said at least one impregnation vessel is capable of moving between said series of impregnation stations.

40. The system of claim 38, wherein at least one of said series of stations comprises multiple positions to accommodate multiple impregnation vessels simultaneously.

25 41. The system of claim 40, wherein said at least one of said stations in said series of stations performs the same impregnation steps at each of its multiple positions.